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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* RONALD S. COK

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Appeal 2008-6128
Application 10/694,550
Technology Center 2800

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Decided: January 26, 2009

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Before EDWARD C. KIMLIN, ADRIENE LEPIANE HANLON, and CHARLES F. WARREN, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from an Examiner's final rejection of claims 1-17, all of the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The following Examiner's rejections are before us for review:

Claims 1-4, 7, and 9-13 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel[1] and May.[2]

Claims 5, 6, and 8 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel, May, and Kawase.[3]

Claims 14-17 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel, May, and Biebuyck.[4]

The claims on appeal are directed to an organic light emitting diode (OLED) display. Claim 1, the only independent claim on appeal, is representative of the subject matter on appeal and reads as follows:

1. An organic light emitting diode display, comprising:

a) a substrate;

b) a plurality of OLEDs formed on the substrate, the OLEDs emitting polarized light wherein the OLEDs comprise:

i) a layer defining a periodic grating structure,

ii) a first electrode layer conforming to the grating structure,

iii) an OLED material layer formed over the first electrode layer and conforming to the grating structure, and

iv) a second electrode layer formed over the OLED material layer and conforming to the grating structure, wherein the first and/or second electrode layers are metallic layers, whereby the periodic grating structure induces surface

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[1] US 6,967,437 B1 issued to Samuel et al. on November 22, 2005.
[2] US 6,211,613 B1 issued to May on April 3, 2001.
[3] US 6,815,886 B2 issued to Kawase on November 9, 2004.
[4] US 5,855,994 issued to Biebuyck et al. on January 5, 1999.

> plasmon cross coupling in the metallic electrode layer(s) to emit polarized light; and
>
> c) a polarizer located over the substrate or an encapsulating cover through which the polarized light is emitted, wherein the polarizer is oriented such that the emitted polarized light passes through the polarizer without being substantially absorbed.

Br. 13, Claims Appendix.[5]

B. ISSUES

Issue 1: Has the Appellant shown that the Examiner reversibly erred in finding that the corrugated microstructure of the OLED in Samuel induces surface plasmon cross coupling in the metallic electrode layer(s) to emit polarized light as recited in claim 1?

Issue 2: Has the Appellant shown that the Examiner reversibly erred in concluding that it would have been obvious to one of ordinary skill in the art to position the polarizer disclosed in May over the substrate of the OLED display in Samuel such that the emitted polarized light passes through the polarizer as recited in claim 1?

Issue 3: Has the Appellant shown that the Examiner reversibly erred in concluding that the combined teachings of Samuel, May, and Kawase render obvious the subject matter of claims 5, 6, and 8?

Issue 4: Has the Appellant shown that the Examiner reversibly erred in concluding that the combined teachings of Samuel, May, and Biebuyck render obvious the subject matter of claims 14-17?

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[5] Appeal Brief dated May 16, 2007.

C. FINDINGS OF FACT

The following findings of fact are supported by a preponderance of the evidence. Additional findings of fact as necessary appear in the Analysis portion of the opinion.

1. Appellant's Specification

According to the Appellant, it is known to use polarizers, such as circular polarizers, with flat panel displays, such as OLED displays, to reduce the reflection of ambient light on the front of the flat panel displays. Spec. 1:9-15.

The Appellant also discloses that it has been proposed to use a periodic, corrugated, grating structure to induce surface plasmon coupling for the light emitting layer in an organic luminescent device, thereby inhibiting lateral transmission and wave guiding of emitted light while increasing the efficiency and the light output of the structure. Spec. 1:28-31.

2. Samuel

Samuel discloses that emissive species embedded in the emissive layer of a light emitting diode (LED) structure emit their energy into the available modes of the structure. These modes include trapped guided modes, including waveguide modes and surface plasmon polariton modes associated with the metal contacts. Samuel 2:55-60.

The invention disclosed in Samuel relates to OLEDs adapted for improved efficiency light emission. The invention also provides a way to control the polarization and spectrum of the emitted light. Samuel 1:9-12.

In its broadest aspect, the invention disclosed in Samuel is a LED comprising at least one microstructured feature adapted to manipulate spontaneous emission or propagation of light. Samuel 3:27-34.

The microstructured feature may be of any form adapted to control emission and preferably comprises a substantially periodic microstructure that is effective in controlling intensity, polarization, or spectrum of the emitted light. Samuel 3:43-47, 3:53-58.

The microstructure preferably acts as a diffraction grating. Samuel 6:19.

In a preferred embodiment, the microstructure is in the form of corrugation. Samuel 6:22-24, 9:14-29.

In the preferred embodiment, Samuel discloses that a strong polarization effect was observed for the corrugated LED. Samuel 10:37-38.

3. May

May discloses an electroluminescent (EL) display comprising an organic light-emitting device and a circular polarizer disposed in front of the viewing surface of the light-emitting device. May 2:24-33.

May Figure 1 illustrates a light emitting polymer (LEP) display with a circular polarizer. May 4:56-57. Figure 1 is reproduced below:

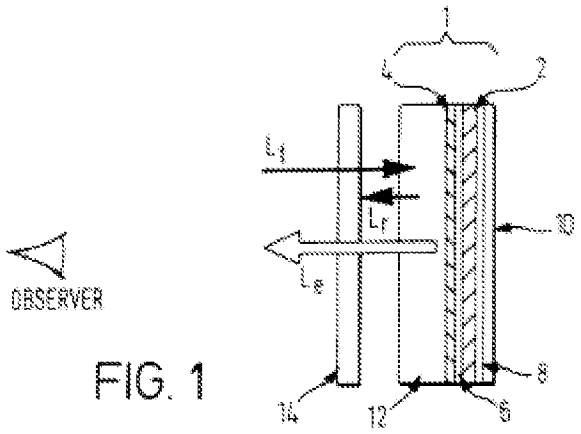


FIG. 1

May Figure 1 depicts a LEP display with a circular polarizer.

May discloses that the contrast of the display is increased by placing circular polarizer **14** in front of the glass substrate **12** of the LEP device. In particular, the effect of the circular polarizer can be seen by considering the arrows denoting transmitted, reflected, and emitted light. The arrow $L_t$ denotes transmitted ambient light incident on the front surface of the display. The arrow $L_r$ denotes ambient light which is reflected from the display and which is blocked by the circular polarizer. The arrow $L_e$ denotes light emitted from the display which is not blocked by the circular polarizer. May 5:15-24.

D. PRINCIPLES OF LAW

A claimed invention is not patentable if the subject matter of the invention would have been obvious to a person having ordinary skill in the art at the time the invention was made. 35 U.S.C. § 103(a); *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007); *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 13 (1966).

Facts relevant to a determination of obviousness include (1) the scope and content of the prior art, (2) any differences between the claimed invention and the prior art, (3) the level of skill in the art, and (4) any relevant objective evidence of obviousness or non-obviousness. *KSR*, 127 S. Ct. at 1734; *Graham*, 383 U.S. at 17-18.

The test for obviousness is not that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to one of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

A person of ordinary skill is not an automaton but is a person of ordinary creativity. *KSR*, 127 S. Ct. at 1742. One of ordinary skill in the art

is presumed to have skills apart from what the prior art references expressly disclose. *In re Sovish*, 769 F.2d 738, 742 (Fed. Cir. 1985).

E. ANALYSIS

1. Issue 1[6]

Referring to Samuel Figures 2 and 3, the Examiner found that Samuel discloses:

> [A]n organic Light emitting display, comprising: a substrate . . ., a plurality of OLEDs (see Figure 3) formed on the substrate (1), the OLEDS emitting polarized light wherein the OLEDS comprise: a layer (photoresist) defining a periodic grating structure (see column 9, lines 25-28), a first electrode layer . . . conforming to the grating structure, an OLED material layer . . . formed over the first electrode layer . . . and conforming to the grating structure, and a second electrode layer . . . formed over the OLED material layer conforming to the grating structure, wherein the first . . . and/or second electrode . . . are metallic layers, whereby the periodic grating structure induces surface plasmon cross coupling in the metallic electrode layer (see column 2, lines 55-62) to emit polarized light.

Ans. 3-4.[7]

The Appellant has not pointed to any error in the Examiner's findings that Samuel discloses an OLED comprising a periodic grating structure and a first metallic electrode layer, an OLED material layer, and a second metallic electrode layer conforming to the grating structure. Rather, the Appellant argues that Samuel does not teach that the periodic grating structure is configured to induce surface plasmon cross coupling in the metallic electrode layer to emit polarized light. The Appellant argues that

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[6] The Appellant does not argue that claims 2-4, 7, and 9-13 are separately patentable from claim 1.

[7] Examiner's Answer dated September 11, 2007.

Samuel attributes polarized light emission to microstructure features adapted to result in Bragg scattering, not surface plasmon cross coupling. Br. 9-10.

To the extent that Samuel does not expressly disclose that "the periodic grating structure induces surface plasmon cross coupling in the metallic electrode layer(s) to emit polarized light," this fact alone is not persuasive of reversible error. *See W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548 (Fed. Cir. 1983) ("it is . . . irrelevant that those using the invention may not have appreciated the results").

Samuel discloses that the microstructure preferably comprises features in the form of physical structuring, such as corrugation, and that the microstructure preferably acts as a diffraction grating. Samuel 6:19-24; *compare* Appellant's Fig. 1. In a preferred embodiment, the electrodes also comprise the microstructure. *See, e.g.,* Samuel 6:10-14.

Samuel discloses that the periodic microstructure improves polarization purity of emitted radiation. Samuel 3:53-58. Indeed, Samuel discloses that a strong polarization effect was observed for the corrugated LED. Samuel 10:37-38.

The Appellant has failed to direct us to any structure recited in claim 1 that distinguishes the claimed periodic grating structure from the corrugated microstructure of the OLED in Samuel. Thus, based on the record before us, it is reasonable to find that the corrugated microstructure of the OLED in Samuel "induces surface plasmon cross coupling in the metallic electrode layer(s) to emit polarized light" as recited in claim 1. *See* Spec. 1:28-31.

To the extent that Samuel discusses "Bragg scattering" in connection with the disclosed periodic microstructure, Samuel expressly discloses that it

does not intend to be limited to this theory. *See* Samuel 3:48-52 ("Without being limited to this theory . . . .").

For the reasons set forth above, the Appellant has not shown that the Examiner reversibly erred in finding that the corrugated microstructure of the OLED in Samuel induces surface plasmon cross coupling in the metallic electrode layer(s) to emit polarized light as recited in claim 1.

2. Issue 2

The Examiner found that Samuel does not disclose that the OLED further comprises a polarizer as recited in claim 1. Nonetheless, the Examiner found that May discloses an EL device comprising a circular polarizer oriented such that the emitted light passes through the polarizer without being substantially absorbed. The Examiner also found that May teaches that the polarizer is suitable for improving the contrast of the display by absorbing light from the environment. Ans. 4.

The Examiner concluded that it would have been obvious to one of ordinary skill in the art to provide the OLED of Samuel with a polarizer as in May to increase the contrast of the image. Ans. 4.

The Appellant does not point to any error in the Examiner's finding that May discloses a separate polarizer. Rather, the Appellant argues that the EL device disclosed in May is not configured to initially emit polarized light. Br. 10.

It is of no moment that May does not disclose an EL device wherein the OLED emits polarized light. The Examiner relied on May to establish that polarizers were known in the art to enhance the contrast of an EL display and would likewise have been expected to enhance the contrast of the light-emitting display in Samuel. *Keller*, 642 F.2d at 425.

The Appellant also argues that May does not teach or suggest orienting the disclosed polarizer in any specific direction relative to the light emitted from the EL device itself. Br. 10.

To the contrary, May Figure 1 shows a polarizer oriented in front of a display wherein the direction of transmitted, reflected, and emitted light is illustrated. In particular, May discloses that Figure 1 shows that ambient light is blocked by the polarizer whereas light emitted from the display is not blocked by the polarizer, thereby increasing the contrast of the display. *See* May 5:15-24. We find that it would have been within the skill of the ordinary artisan to adjust the position of the polarizer relative to the light-emitting display of Samuel to increase the contrast of the display in the manner taught by May Figure 1.

For the reasons set forth above, the Appellant has not shown that the Examiner reversibly erred in concluding that it would have been obvious to one of ordinary skill in the art to position the polarizer disclosed in May over the substrate of the OLED display in Samuel such that the emitted polarized light passes through the polarizer as recited in claim 1.

3. Issue 3

The Appellant does not point to any error in the Examiner's findings or conclusion of obviousness as to claims 5, 6, and 8. Rather, the Appellant argues that Kawase fails to overcome the deficiencies of Samuel and May in the rejection of claim 1. Br. 11.

For the reasons set forth above, the Appellant has failed to show that the Examiner reversibly erred in concluding that the combined teachings of Samuel and May render obvious the subject matter of claim 1. Therefore,

there are no deficiencies in Samuel or May that must be overcome by Kawase in the rejection of claim 1.

4. Issue 4

The Appellant does not point to any error in the Examiner's findings or conclusion of obviousness as to claims 14-17. Rather, the Appellant argues that Biebuyck fails to overcome the deficiencies of Samuel and May in the rejection of claim 1. Br. 11.

For the reasons set forth above, the Appellant has failed to show that the Examiner reversibly erred in concluding that the combined teachings of Samuel and May render obvious the subject matter of claim 1. Therefore, there are no deficiencies in Samuel or May that must be overcome by Biebuyck in the rejection of claim 1.

F. DECISION

The rejection of claims 1-4, 7, and 9-13 under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel and May is affirmed.

The rejection of claims 5, 6, and 8 under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel, May, and Kawase is affirmed.

The rejection of claims 14-17 under 35 U.S.C. § 103(a) as unpatentable over the combination of Samuel, May, and Biebuyck is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 35 U.S.C. § 1.136(a) (2008).

AFFIRMED

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